

Claims

- [c1] A Pullulan free edible film composition comprising:
 - a.) an effective amount of a film forming agent; and
 - b.) an effective amount of an antimicrobial agent wherein the antimicrobial agent comprises citral.
- [c2] The composition of claim 1, wherein the film forming agent comprises a mixture of maltodextrin, a filler and a hydrocolloid.
- [c3] The composition of claim 2, wherein the maltodextrin comprises about 5 wt.% to about 60wt.% of the edible film.
- [c4] The composition of claim 2, wherein the maltodextrin comprises about 20 wt.% to about 40 wt.% of the edible film.
- [c5] The composition of claim 2, wherein the hydrocolloid comprises about 10 wt.% to about 50 wt.% of the edible film.
- [c6] The composition of claim 2, wherein the hydrocolloid comprises about 20 wt.% to about 30 wt.% of the edible film.

- [c7] The composition of claim 2, wherein the filler comprises about 5 wt.% to about 30 wt.% of the edible film.
- [c8] The composition of claim 2, wherein the filler comprises about 15 wt.% to about 25 wt.% of the edible film.
- [c9] The composition of claim 2, wherein the hydrocolloid comprises a material selected from the group consisting of a natural gum, a biosynthetic gum, a natural seaweed, a natural plant extrudate, a natural fiber extract, a gelatin, a biosynthetic process starch, a cellulosic material, an alginate, pectin and combinations thereof.
- [c10] The composition of claim 9, wherein the natural gum comprises a gum selected from the group consisting of natural seed gum, guar gum, locust gum, tara gum, gum Arabic, ghatti gum, agar gum and zanthan gum.
- [c11] The composition of claim 9, wherein the alginate comprises sodium alginate or calcium alginate.
- [c12] The composition of claim 9, wherein the natural seaweed comprises a carrageenan.
- [c13] The composition of claim 2, wherein the filler comprises a food-grade bulk filler selected from the group consisting of microcrystalline cellulose, a cellulose polymer, magnesium carbonate, calcium carbonate, ground lime-

stone, a silicate, clay, talc, titanium dioxide, a calcium phosphate and combinations thereof.

- [c14] The composition of claim 13, wherein the cellulose polymer comprises wood.
- [c15] The composition of claim 14, wherein the silicate comprises magnesium or aluminum silicate.
- [c16] The composition of claim 13, wherein the calcium phosphate comprises mono-calcium phosphate, di-calcium phosphate, or tri-calcium phosphate.
- [c17] The composition of claim 1, wherein the citral comprises about 1wt.% to about 10 wt.% of the edible film.
- [c18] The composition of claim 1, wherein the citral comprises about 8 wt.% of the edible film.
- [c19] The composition of claim 1, wherein the citral comprises about 5 wt.% of the edible film.
- [c20] The composition of claim 1, wherein the citral comprises up to about 25 wt.% of the edible film.
- [c21] The composition of claim 1, further comprising an effective amount of a medicament.
- [c22] The composition of claim 21, wherein the medicament comprises an oral cleansing or breath freshening com-

pound selected from the group consisting of a pH control agent, inorganic components for tartar or caries control, a breath freshening agent, an anti-plaque/anti-gingivitis agent, a saliva stimulating agent, a pharmaceutical agent, a nutraceutical agent, a vitamin, a mineral and combinations thereof.

- [c23] The composition of claim 22, wherein the pH control agent comprises urea.
- [c24] The composition of claim 22, wherein the inorganic components for tartar or caries control comprise phosphates or fluorides.
- [c25] The composition of claim 22, wherein the breath freshening agent comprises zinc gluconate.
- [c26] The composition of claim 22, wherein the anti-plaque/anti-gingivitis agent comprises chlorhexidine, CPC or triclosan.
- [c27] The composition of claim 22, wherein the saliva stimulating agent comprises a food acid.
- [c28] The composition of claim 27, wherein the food acid comprises an acid selected from the group consisting of citric, lactic, maleic, succinic, ascorbic, adipic, fumaric, tartaric and combinations thereof.

- [c29] The composition of claim 1, further comprising an effective amount of a softening agent.
- [c30] The composition of claim 29, wherein the softening agent comprises about 0 wt.% to about 20 wt.% of the edible film.
- [c31] The composition of claim 29, wherein the softening agent comprises about 2 wt.% to about 10 wt.% of the edible film.
- [c32] The composition of claim 29, wherein the softening agent comprises a plasticizer including a compound selected from the group consisting of sorbitol, glycerin, polyethylene glycol, propylene glycol, hydrogenated starch hydrolysates, corn syrup and combinations thereof.
- [c33] The composition of claim 1, further comprising an effective amount of a coloring agent.
- [c34] The composition of claim 1, further comprising an effective amount of a flavoring agent.
- [c35] The composition of claim 34, wherein the flavoring agent comprises about 0.1 wt.% to about 20 wt.% of an edible film.

- [c36] The composition of claim 34, wherein the flavoring agent comprises about 10 wt.% to about 15 wt.% of the edible film.
- [c37] The composition of claim 34, wherein the flavoring agent comprises a material selected from the group consisting of essential oils, synthentic flavors, fruit essences, anise, flavor oils with germ killing properties and mixtures thereof.
- [c38] The composition of claim 37, wherein the essential oils are selected from the group consisting of citrus oil, spearmint oil, mint oil, clove oil, oil of wintergreen and combinations thereof.
- [c39] The composition of claim 37. wherein the flavor oils with germ killing properties comprise menthol, eucalyptol, thymol and combinations thereof.
- [c40] The composition of claim 1, further comprising an effective amount of an emulsifying agent.
- [c41] The composition of claim 40, wherein the emulsifying agent comprises lecithin, (C10-C18) fatty acids, mono-acyl glycerides, di-acyl glycerides, ox bile extract, polyglycerol esters, polyethylene sorbitan esters, propylene glycol, sorbitan monopalmitate, sorbitan monostearate, sorbitan tristearate, enzyme modified lecithin, hydroxy-

lated lecithins and combinations thereof.

- [c42] A method of oral cleansing by applying a Pullulan-free edible film to the oral cavity, wherein the edible film comprises:
 - a.) an effective amount of a film forming agent; and
 - b.) an effective amount of an antimicrobial agent wherein the antimicrobial agent comprises citral.
- [c43] The method of claim 42, wherein said citral comprises at least about 1 wt% of the edible film.
- [c44] The method of claim 42, wherein said citral comprises about 5 wt.% of the edible film.
- [c45] The method of claim 42, wherein said citral comprises an amount up to about 25 wt.% of the edible film.
- [c46] The method of claim 42, wherein the film forming agent comprises a mixture of a maltodextrin, a filler and a hydrocolloid.
- [c47] The method of claim 46, wherein the hydrocolloid comprises about 5 wt.% to about 60 wt.% of the edible film.
- [c48] The method of claim 46, wherein the hydrocolloid comprises about 10 wt.% to about 50 wt.% of the edible film.
- [c49] The method of claim 46, wherein the filler comprises

about 5 wt.% to about 30 wt.% of the edible film.

- [c50] The method of claim 46, wherein the hydrocolloid comprises a material selected from the group consisting of a natural gum, a biosynthetic gum, a natural seaweed, a natural fiber extract, a gelatin, a biosynthetic process starch, a cellulosic material, an alginate, pectin and combinations thereof.
- [c51] The method of claim 50, wherein the natural gum comprises a gum selected from the group consisting of natural seed gum, guar gum, locust gum, tara gum, gum Arabic, ghatti gum, agar gum, xanthan gum and combinations thereof.
- [c52] The method of claim 50, wherein the alginate comprises sodium alginate or calcium alginate.
- [c53] The method of claim 50, wherein the natural seaweed comprises a carrageenan.
- [c54] The method of claim 46, wherein the filler comprises a food-grade bulk filler selected from the group consisting of microcrystalline cellulose polymer, magnesium carbonate, calcium carbonate, ground limestone, a silicate, clay, talc, titanium dioxide, a calcium phosphate and combinations thereof.

- [c55] The method of claim 54, wherein the cellulose polymer comprises wood.
- [c56] The method of claim 54, wherein the silicate comprises magnesium or aluminum silicate.
- [c57] The method of claim 54, wherein the calcium phosphate comprises mono-calcium phosphate, di-calcium phosphate or tri-calcium phosphate.
- [c58] The method of claim 42, wherein the edible film further comprises one or more of a medicament, a softening agent, a coloring agent, a flavoring agent and an emulsifying agent.
- [c59] The method of claim 42, wherein the edible film delivers at least about 0.1 wt.% citral to the oral cavity.
- [c60] The method of claim 42, wherein the edible film delivers at least about 0.01 wt.% citral to the oral cavity.
- [c61] The method of claim 42, wherein the edible film delivers at least about 0.005 wt.% citral to the oral cavity.
- [c62] A method of making a Pullulan-free film comprising:
 - a.) forming an aqueous solution that includes a maltdextrin, a hydrocolloid, and a filler;
 - b.) adding an effective amount of an antimicrobial agent to the aqueous solution, wherein the antimicrobial agent

comprises citral and;

c.) drying the aqueous solution to form a dry edible film.

[c63] The method of claim 62, wherein adding an effective amount of an antimicrobial agent comprises adding sufficient citral extract such that the dry edible film comprises at least about 1 wt.% citral.

[c64] The method of claim 62, wherein adding an effective amount of an antimicrobial agent comprises adding sufficient citral such that the dry edible film comprises up to 25 wt.% citral.

[c65] The method of claim 62, wherein forming an aqueous solution comprises adding sufficient maltodextrin such that the dry edible film comprises about 5 wt.% to about 50 wt.% maltodextrin.

[c66] The method of claim 62, wherein forming an aqueous solution comprises adding sufficient hydrocolloid such that the dry edible film comprises about 10 wt.% to about 50 wt.% hydrocolloid.

[c67] The method of claim 62 wherein forming an aqueous solution comprises adding sufficient filler such that the dry edible film comprises about 5 wt.% to about 30 wt.% filler.

- [c68] The method of claim 62, wherein forming an aqueous solution further comprises adding one or more of a medicament, a softening agent, a coloring agent, a flavoring agent, and an emulsifying agent.
- [c69] The method of claim 62, further comprising heating the aqueous solution to a temperature of about 40°C to about 60°C prior to drying the aqueous solution.
- [c70] The treatment for reducing the number or activity of bacteria in the oral cavity comprising the steps of:
 - a.) providing an edible film composition comprising citral in an amount sufficient to kill or deactivate oral bacteria; and
 - b.) causing a person in need of the treatment to consume that edible film composition whereby the bacteria in the oral cavity of the person is reduced or inactivated by the treatment.
- [c71] A method of oral cleansing by consuming a chewing gum comprising:
 - a.) a gum base;
 - b.) a flavor;
 - c.) a sweetener; and
 - d.) citral.
- [c72] The method of claim 71, wherein the amount of citral is

present up to about 5.0% by weight of the chewing gum composition.

- [c73] The method of claim 71, wherein the amount of citral is present up to about 1.0% by weight of the chewing gum composition.
- [c74] The method of claim 71, wherein the amount of citral is present up to about 0.25% by weight of the chewing gum composition.
- [c75] The method of claim 71, wherein the amount of citral is present up to about 0.01% by weight of the chewing gum product.
- [c76] The method of claim 71, further comprising a food acceptable zinc and copper salts of acids selected from the group consisting of gluconic acid, lactic acid, acetic acid, citric acid and combinations thereof.
- [c77] The method of claim 71, further comprising pyrophosphate or polyphosphate.
- [c78] The method of claim 71, wherein said citral is encapsulated.
- [c79] The method of claim 71, wherein said citral is spray dried.

- [c80] The method of claim 71, wherein said chewing gum composition is coated.
- [c81] The method of claim 80, wherein said citral is present in said coating.
- [c82] The method of claim 81, wherein said citral is encapsulated.
- [c83] The method of claim 71, further comprises a high intensity sweetener selected from the group consisting of , sucralose, aspartame, NAPM derivatives such as neotame, salts of acesulfame, altitame, saccharin and its salts, cyclamic acid and its salts, glycyrrhizinate, dihydrochalcones, thaumatin, monellin, and combinations thereof.
- [c84] The method of claim 71, further comprising a medicament.
- [c85] The method of claim 71, further comprising an active agent.
- [c86] The method of claim 71, further comprising a cooling agent selected from the group consisting of menthol, ethyl p-menthane carboxamide, N,2,3 – trimethyl-2-isopropyl–butanamide, menthyl glutarate FEMA 4006, menthyl succinate, menthol PG carbonate, menthol EG

carbonate, menthyl lactate, menthone glyceryl ketal, menthol glyceryl ether, N-tert-butyl-p-menthane-3-carboxamide, p-menthane-3-carboxylic acid glycerol ester, methyl-2-isopropyl-bicyclo (2.2.1), heptane-2-carboxamide, menthol methyl ether and combinations thereof.

- [c87] The method of claim 71, formulated to deliver at least 0.005% concentration of citral to the oral cavity.
- [c88] The method of claim 71, further comprising an oral health ingredient.
- [c89] A method of oral cleansing by consuming a confectionery product containing an antimicrobial agent.
- [c90] The method of claim 89, wherein said antimicrobial agent is citral.
- [c91] The method of claim 90, wherein said citral is present in an amount up to 3% by weight of the confectionery product.
- [c92] The method of claim 90, wherein said citral is present in an amount of about 1% by weight of the chewing gum product.
- [c93] The method of claim 90, wherein the form of said confectionery product is a hard candy.

- [c94] The method of claim 93, wherein said hard candy contains about 1.0% to about 4% moisture by weight of the confectionery product.
- [c95] The method of claim 90, wherein the form of said confectionery product is a chewing candy.
- [c96] The method of claim 90, wherein the form of said confectionery product is a coated chewy center candy.
- [c97] The method of claim 90, wherein the form of said confectionery product is a tabletted candy.
- [c98] The method of claim 90, further comprising a color.
- [c99] The method of claim 90, further comprising a flavor.